Australian Government
Australian Radiation Protection and Nuclear Safety Agency

Fact Sheet 30

Ultraviolet Radiation Emissions from Compact Fluorescent Lights

The introduction of energy saving compact fluorescent lights (CFLs) and the eventual replacement of incandescent lights has benefits for the community, but recent reports that CFLs can emit ultraviolet radiation (UVR) have also raised some concerns

ARPANSA has measured the UVR and visible light emissions from a number of CFLs as well as incandescent and halogen lamps retailing in Australia.

In all, ARPANSA tested 24 different CFLs covering most of the well known brands (Nelson, Philips, Megaman, GE and Mirabella) and included both single and double envelope units ranging from 5 Watts (W) to 28W. For comparison purposes, 3 halogen lamps (10 W Philips clear and frosted and 50W Comptons) and 8 incandescent globes (75W and 100W clear and frosted Philips and Condor brands) were also tested.

Measurements of the emissions from the lights were made in the ultraviolet part of the spectrum (250 to 400 nm) and in the visible range (400 to 890 nm) at distances of 10, 25, 50, 100 and 200 cms.

At the measurement distance of 10 cms, which was considered to be the closest distance that people would be to the lamps, even in desk top applications, four of the CFLs had allowed exposure times shorter than 8 hours, while a further two CFLs had times of approximately 10 hours. For comparison purposes, the allowed exposure limits will be exceeded in typical midday summer sunshine in approximately 6 mins in Brisbane and 7 mins in Melbourne.

The emissions from all of the lamps decreased rapidly with distance. At a distance of 25 cms, none of the CFLs had allowed exposures times shorter than 8 hours, and therefore did not exceed the limits set here in Australia (ARPANSA RPS12)[1] and internationally by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)[2]. Although emitting some UVR, none of the double envelope CFLs or the incandescent and halogen lamps produced sufficient UVR to be hazardous, even at the 10 cm distance.

Figure 1. Typical compact fluorescent light bulbs, with the single envelope compact fluorescent unit on the left and the double envelope (or encapsulated) unit on the right.

The exposure limits of RPS 12[1] and ICNIRP[2] are conservative for normal population skin types, however they may not apply to people with medical conditions that may make them highly photosensitive. For distances in excess of 25 cms, both forms of CFLs are suitable for use. It is advisable for people to utilise double envelope or encapsulated CFLs for desktop use at distances closer than 30 cms.

1. ARPANSA Radiation Protection Series No.12 *Radiation Protection Standard for Occupational Exposure to Ultraviolet Radiation* (2006).
2. International Commission on Non-Ionizing Radiation Protection. *Guidelines on Limits of Exposure to Ultraviolet Radiation of Wavelength between 180 nm and 400 nm (Incoherent Optical Radiation)*. Health Physics, 87 (2), 171-186, 2004.

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